

	STAFF REPORT
Date:	May 17, 2022
Prepared By:	Charles F. Soules, PE – Director of Public Works
Subject:	Trench Backfill Requirements

In May of 2020, the City adopted the 2017 Kansas City Metro American Public Works Association (APWA) Construction Standards with recommended modifications including concrete and asphalt mix designs, pavement subgrade treatment, and backfilling of excavations / trenches under pavements to be flowable fill.

Soil is never as compact as it is in a virgin state (never been excavated). When infrastructure is constructed (sewer, water and storm sewer lines, power, gas, cable and communication lines) the soil is removed, the infrastructure is installed and backfilled. When this occurs under pavement, compaction of the excavated material is specifically important to avoid settlement and pavement failure.

Flowable fill is a low strength (less than 2000 psi) diggable concrete. Typically, a sand and cement mix without the aggregate found in concrete. Flowable fill is used in excavations where you do not want any settlement and cannot get the equipment into an area to provide appropriate compaction i.e., adjacent to structures and under pavements. Flowable fill is fluid and fills voids and can be placed next to structures (manholes and water valves) and no further compaction is needed.

Flowable fill does come with an expense and while this material is ideal for backfilling when installing some infrastructure, it becomes economically not feasible. Following consensus brought to the Board, staff met with local developers, contractors and engineers to discuss the best approach to obtaining good backfill operations. We came to a consensus that will still maintain the integrity of the infrastructure (street) that will be placed above excavated areas and avoid settlements. The proposed specification is detailed in Exhibit 1.

One objective is that during the design of these subdivisions, the engineer needs to look at placing the sewer in the rear yards to avoid multiple crossings for this service.

The consensus specifications still require flowable fill in narrow trenches as contractors do not have equipment small enough to properly compact narrow trenches. We are recommending AB-3 for medium trenches, which is a base rock material that compacts very well. For large trenches / crossings the contractor can use the excavated material and compact in 6" - 8" lifts. Unless the trench is backfilled with Flowable Fill strict

compaction testing by an independent testing firm will be required to be approved by the City prior to placement of any curb and gutter or street surface.

Staff is recommending the approval of the amendment to the backfill specifications as detailed in Exhibit 1.

EXHIBIT 1

City of Smithville

Excavation / Backfill Specifications

Engineer shall design subdivisions to minimize crossings / excavations in /under the street from back of curb to back of curb

<u>Trench</u>	<u>Backfill Material</u>		<u>Placement</u>	<u>Compaction</u>	<u>Testing</u>
Trench 0 - 24" wide	Flowable Fill	water service lines, grinder pump sewer service lines, force mains (assuming not more than 4ft deep)			
Trenches less than 48" deep	Compacted AB-3 or MODot Type 1 or 5	Water mains	8" lifts	95%	test every lift each road crossing or every 50 ft of trench length
Trench 24"- 48" wide	Flowable Fill or Aggregate Base Material AB-3 or MoDOT Type 1 of 5		8" lifts	95%	test every lift each road crossing or every 50 ft of trench length
Wide Trench > 48"	Suitable Backfill		8" lifts	95%	test every lift each road crossing or every 50 ft of trench length

Developer / Contractor will have an approved testing firm on site during all compacted trench operations to perform compaction testing. Compaction test reports will be provided to City on weekly basis and at least one week prior to placing curbs or pavement for approval to proceed.

